Listing of Claims:

Claim 1 (previously presented): An optical fiber comprising:

an optically diffractive film formed on an end portion of the optical fiber;

a transparent DLC layer included in said diffractive film, said transparent DLC layer being formed either onto the face of the optical fiber end portion, or onto an endface of a collimator joined to the endface of the optical fiber; and

a diffraction grating included in said DLC layer, said diffraction grating containing local regions of relatively high refractive index and local regions of relatively low refractive index.

Claim 2 (previously presented): An optical fiber as set forth in claim 1, wherein said diffractive film allows a single optical beam including a plurality of wavelengths to be split into a plurality of beams depending on the wavelength, and functions as a wavelength-division multiplexer/demultiplexer for causing a plurality of beams having different wavelengths to combine into a unitary optical beam.

Claim 3 (previously presented): An optical fiber as set forth in claim 1, wherein said diffractive film allows a single-wavelength optical beam to be split into a plurality of beams, and functions as a power splitter/combiner for causing a plurality of single-wavelength beams to combine into a unitary optical beam.

Claim 4 (previously presented): An optical fiber as set forth in claim 1, wherein said diffractive film has polarization-division multiplexer/demultiplexer functionality for separating, and causing to unite, TE waves and TM waves contained in a single-wavelength optical beam.

Claim 5 (previously presented): An optical fiber as set forth in claim 1, wherein said diffractive film has wave-plate functionality with respect to either TE waves or TM waves contained in a single-wavelength optical beam.

Claim 6 (previously presented): An optical fiber comprising:

an optically diffractive film formed on an end portion of the optical fiber;

a first transparent DLC layer and a second transparent DLC layer included in said diffractive film and laminated in turn onto an face of the optical fiber end portion, or onto an endface of a collimator joined to the endface of the optical fiber;

a first diffraction grating included in said first DLC layer, said first diffraction grating containing local regions of relatively high refractive index and local regions of relatively low refractive index;

a second diffraction grating included in said second DLC layer, said second diffraction grating containing local regions of relatively high refractive index and local regions of relatively low refractive index, wherein

said first DLC layer has polarization-division demultiplexing functionality for splitting by polarization TE waves and TM waves contained in a single-wavelength optical beam,

said second DLC layer has wave-plate functionality with respect to either TE waves or TM waves contained in a single-wavelength optical beam, and

said first and second DLC layers function interactively as an optical isolator.

Claim 7 (previously presented): An optical fiber as set forth in claim 6, wherein said diffractive film is formed onto the endface of the optical fiber, and has a thickness of 20 μm or less.

Claim 8 (previously presented): An optical fiber as set forth in claim 7, further comprising a connector for retaining the optical fiber end portion where the diffractive film is formed and for abutting the fiber end portion against and connecting it to an endface of another optical fiber.

Claim 9 (previously presented): An optical fiber as set forth in claim 6, further comprising a transparent interlayer inserted in between said first DLC layer and said second DLC layer.

Claim 10 (previously presented): An optical fiber as set forth in claim 1 or 6, wherein said diffractive film includes the diffraction grating being functional with respect to light containing wavelengths within a range of from 0.8 μm to 2.0 μm.

Claim 11 (previously presented): A method of manufacturing an optical fiber as set forth in claim 1 or 6, the optical-fiber manufacturing method comprising a step of forming the high refractive-index regions contained in the diffraction grating(s) by irradiating said DLC layer(s) in a predetermined pattern with an energy beam to raise the refractive index of the layer(s).

Claim 12 (previously presented): A method of manufacturing the optical fiber set forth in claim 9, the optical-fiber manufacturing method comprising steps of:

depositing said first DLC layer onto the endface of the optical fiber, or onto the endface of the collimator joined to the endface of the optical fiber;

forming said high-refractive index regions in the first DLC layer by irradiating it with an energy beam to raise its refractive index in a first predetermined pattern;

depositing said transparent interlayer and said second DLC layer in turn; and

forming said high-refractive index regions in said second DLC layer by irradiating it with an energy beam to raise its refractive index in a second predetermined pattern; wherein

when said second DLC layer is being irradiated in said second predetermined pattern with an energy beam, said transparent interlayer acts to prevent the energy beam from having an effect on said first DLC layer.

Claim 13 (previously presented): An optical-fiber manufacturing method as set forth in claim 11, wherein the energy beam is selected from an X-ray beam, an electron beam, or an ion beam.

Claim 14 (previously presented): An optical-fiber manufacturing method as set forth in claim 11, wherein said DLC layer(s) is deposited by a plasma CVD technique.

Claim 15 (previously presented): An optical-fiber manufacturing method as set forth in claim 12, wherein the energy beam is selected from an X-ray beam, an electron beam, or an ion beam.

Claim 16 (previously presented): An optical-fiber manufacturing method as set forth in claim 12, wherein said first and second DLC layers are deposited by a plasma CVD technique.